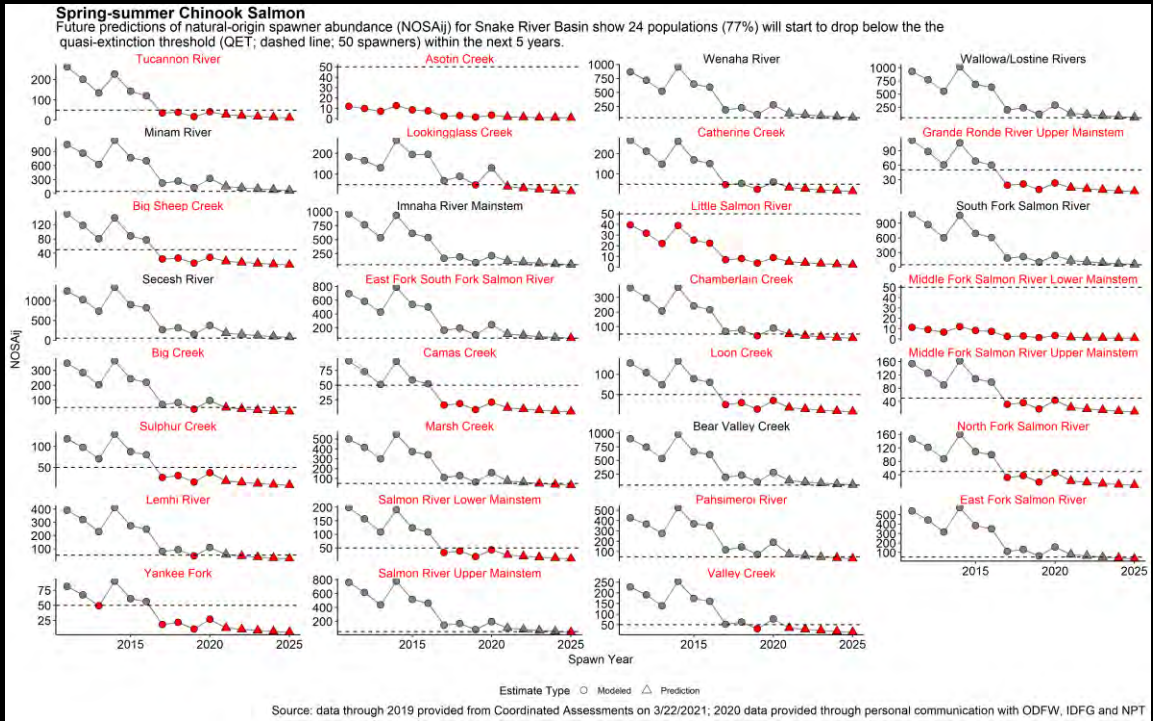




# Snake Basin Chinook and Steelhead Quasi-Extinction Threshold Alarm and Call to Action



- **42% of the Snake Basin spring/summer Chinook populations have natural origin spawner abundance currently at or below QET (50)**
- **77% of the populations predicted to drop below critical level of 50 spawners by 2025**

*“We are the circle. That’s what life is all about. We take care of one another. So when we have someone in trouble, that’s when the rest of us have to step in.”*

—Elmer Crow, Nez Perce





# What is Quasi-Extinction?

Abundance threshold for risk assessment and/or management intervention

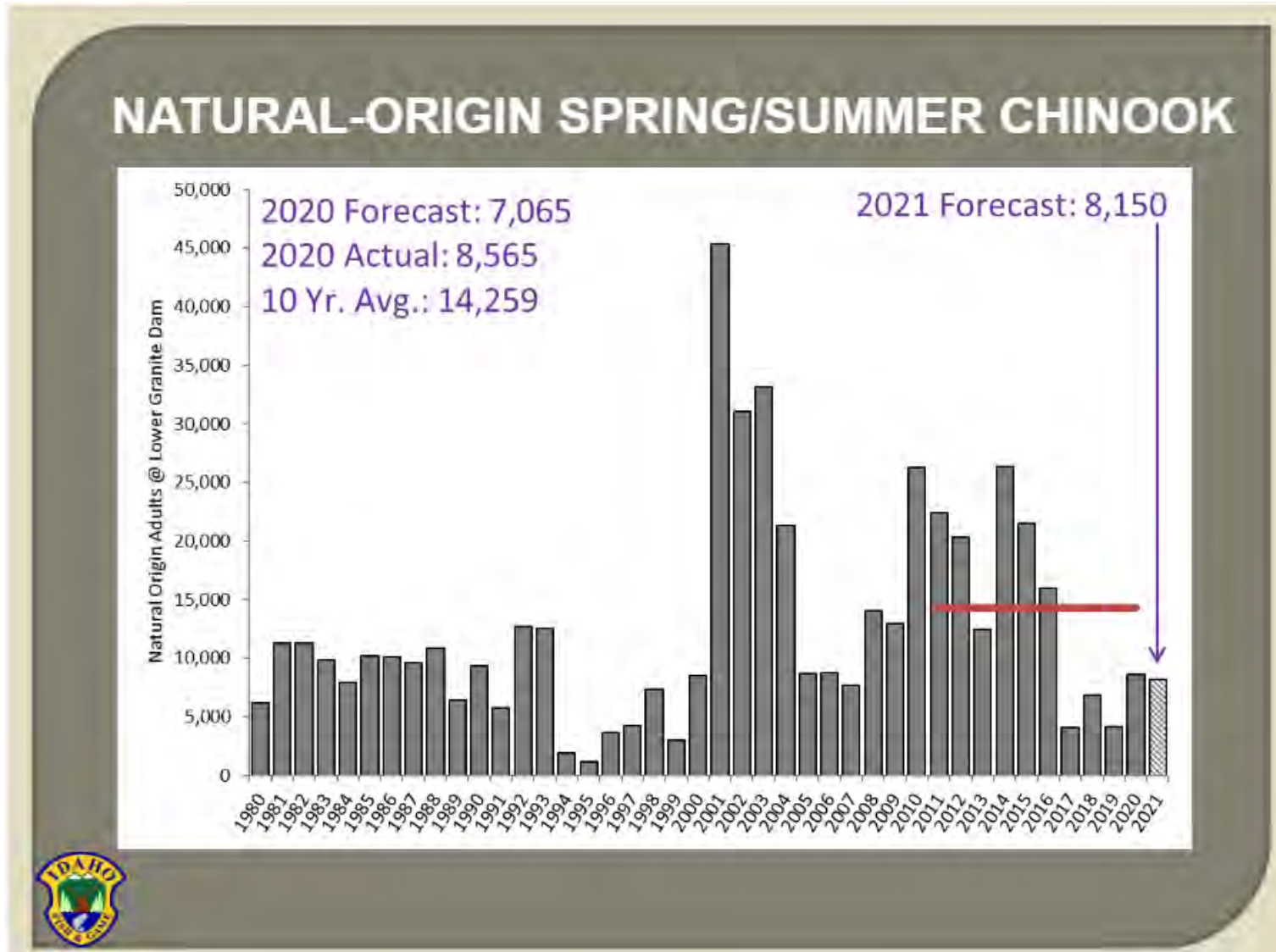
- Adult salmon abundance in a population nearing absolute extinction.
- A state where the risk of extinction cannot be modeled but is considered to be unacceptably high.
- A population that is uncertain to persist.
- Probability of recovery low without substantial intervention.



# Snake River Salmon and Steelhead Returns

## IDFG Presentation to NPCC March 2021

<https://nwcouncil.app.box.com/s/h0iyex0w1oo9m98fv4hojmzv0qogibpi> (Slide 3)



Snake Basin Chinook and Steelhead Quasi-Extinction Threshold Alarm and Call to Action  
Presented to Northwest Power and Conservation Council May 5, 2021  
Nez Perce Tribe Department of Fisheries Resources Management





# Management Goals and Thresholds

## Snake Basin Spring/summer Chinook Salmon 38 Extant (32 listed and 6 non-listed) Populations

Desired - Healthy and Harvestable – CBP, NPCC

- Range from 2,000 to 8,000 per population.
- 179,000 escapement at Lower Granite Dam, excluding blocked areas (235,000 with blocked areas).
- Aggregated values for Snake Basin populations = 121,000 (124,000 including Tucannon).

Delisting – Minimum Abundance Threshold (MAT) – NOAA

- Range from 500 to 2,000 per population.
- Aggregated values for Snake Basin populations = 30,000 (29,250 at Lower Granite Dam).

Critical - Quasi-Extinction Threshold (QET) - NOAA

- 50 or fewer spawners within a population for four consecutive years.
- Aggregated values for Snake Basin populations = 1,900 (1,850 at Lower Granite Dam).

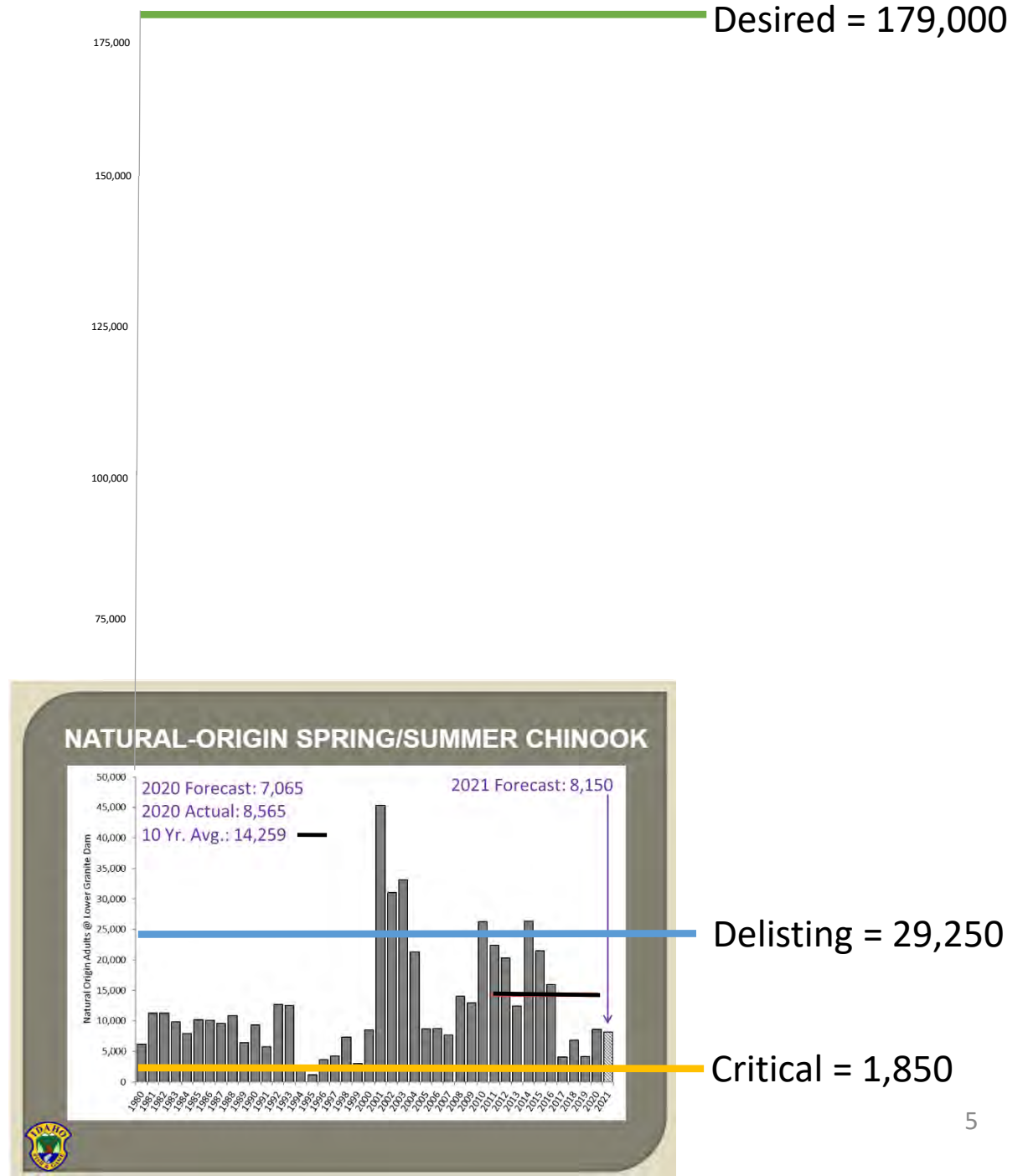
Extirpation - Functionally Extinct or Absolute Extinction

- One or fewer adults in each year of cohort/generation



# Snake River Chinook Salmon Returns Relative to Aggregated Population Management Goals and Thresholds

Modified from IDFG March 2021  
 Presentation to NPCC





# Population Specific Abundance Data Sources and Attribution

- Spring/summer Chinook NOSAij (weir M/R and SGS surveys)
  - 1980-2019 - Coordinated Assessments
  - 2020 – Personal Communication with IDFG, ODFW, NPT
- Results limited to 31 of 32 ESA listed spring/summer Chinook populations.
- Asotin, Lookingglass, and Big Sheep creeks already classified as functionally extirpated.
- Panther Creek and all Clearwater basin populations classified as extirpated.
- Natural origin abundance data includes jacks.



Washington  
Department of  
**FISH** and  
**WILDLIFE**



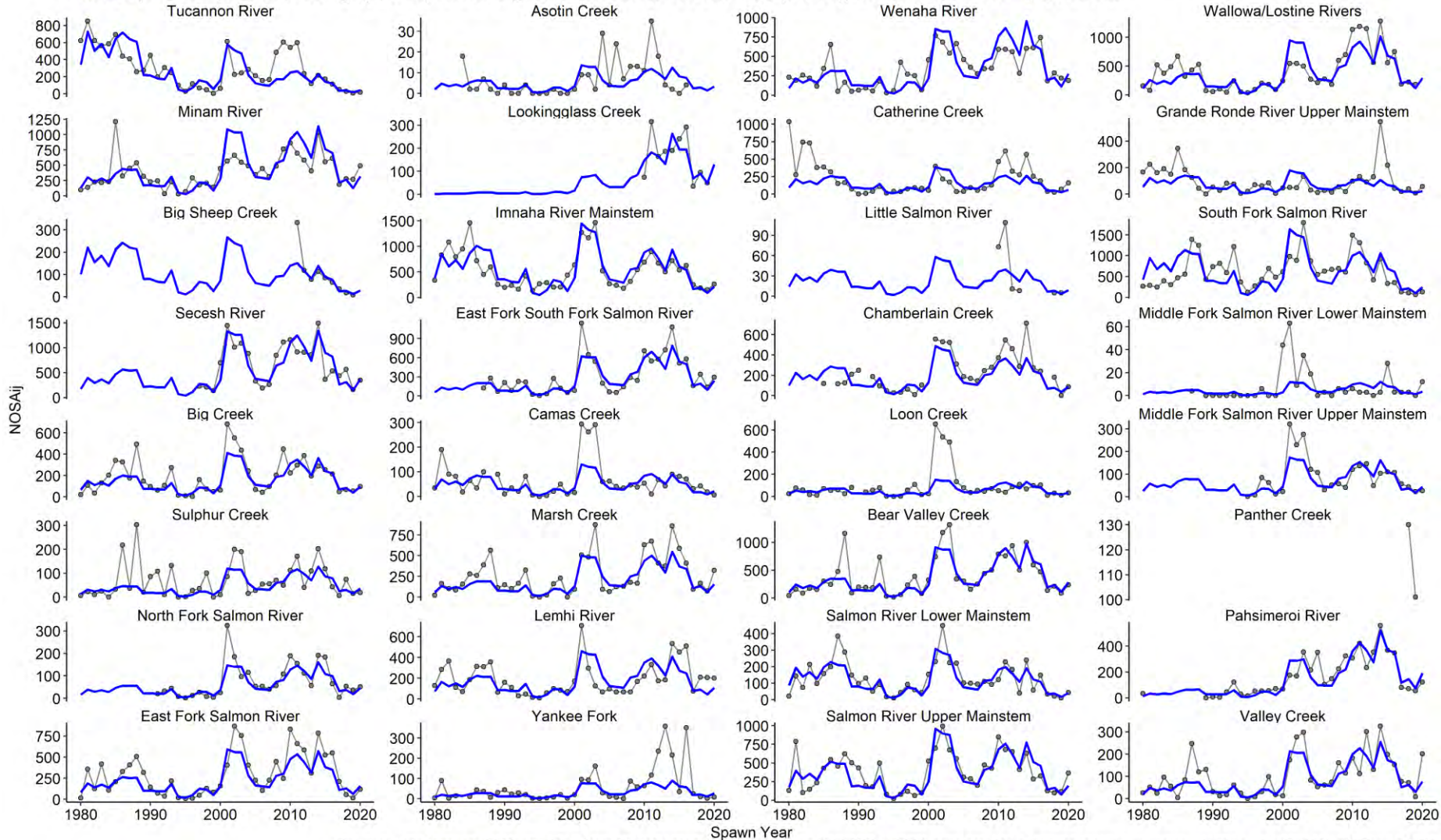


# Abundance Fits Common Model

## Spring/summer Chinook

### Spring-summer Chinook Salmon

Modeled (blue lines) and empirical (grey points) natural-origin spawner abundance estimates (NOSaj) for Snake River Basin populations.



Source: data through 2019 provided from Coordinated Assessments on 3/22/2021; 2020 data provided through personal communication with ODFW, IDFG and NPT

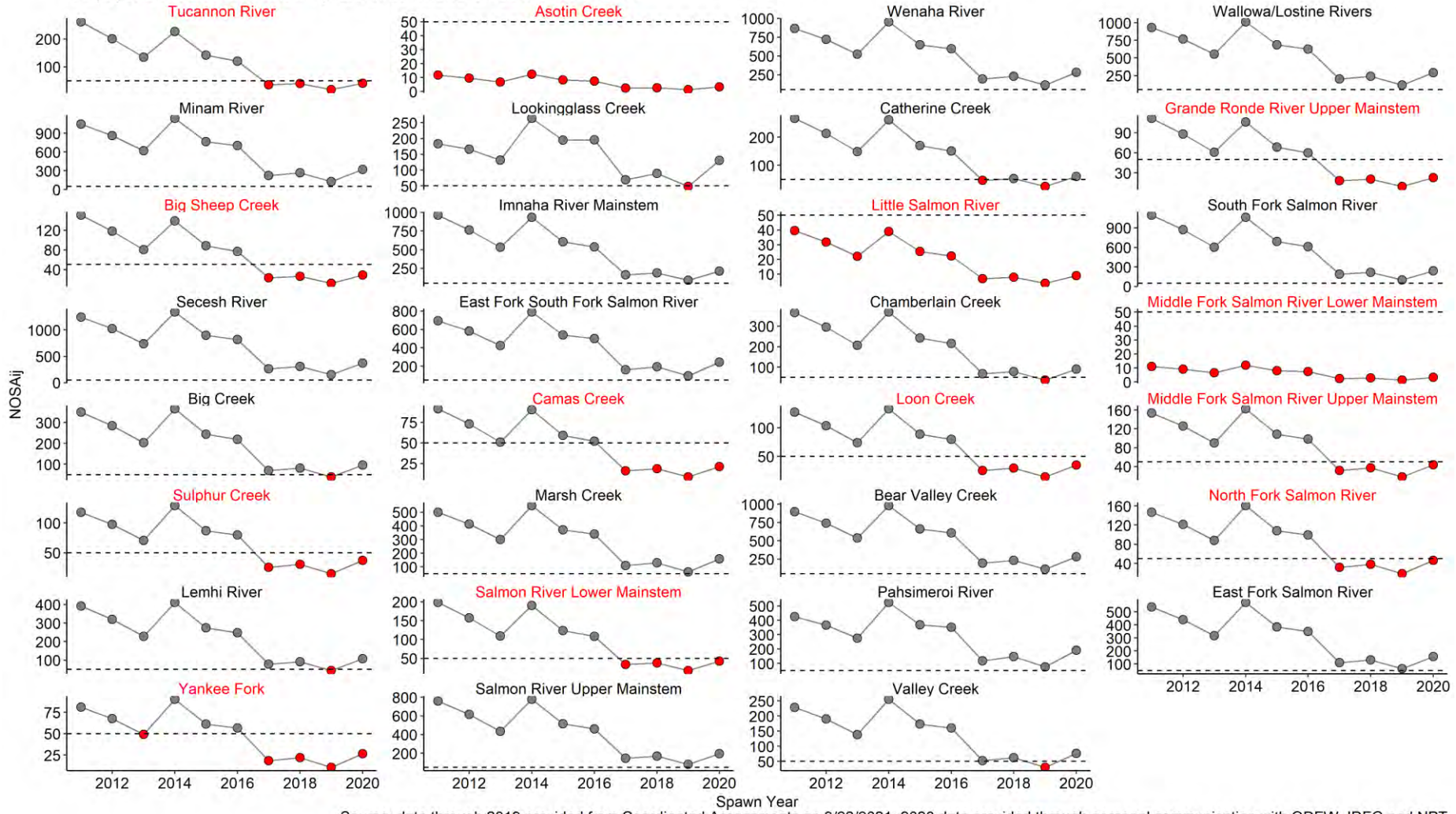




# 13 (42%) Spring/Summer Chinook Populations Currently At or Below QET (50)

## Spring-summer Chinook Salmon

Modeled natural-origin spawner abundance (NOSaj) estimates for Snake River Basin populations relative to the quasi-extinction threshold (QET; dashed line, 4 years below 50 NOSaj) for the last 10-years (2011-2020). During the last four consecutive years 42% of the 31 populations had more than 4 years of abundances below the QET.



Source: data through 2019 provided from Coordinated Assessments on 3/22/2021; 2020 data provided through personal communication with ODFW, IDFG and NPT

Snake Basin Chinook and Steelhead Quasi-Extinction Threshold Alarm and Call to Action  
Presented to Northwest Power and Conservation Council May 5, 2021  
Nez Perce Tribe Department of Fisheries Resources Management





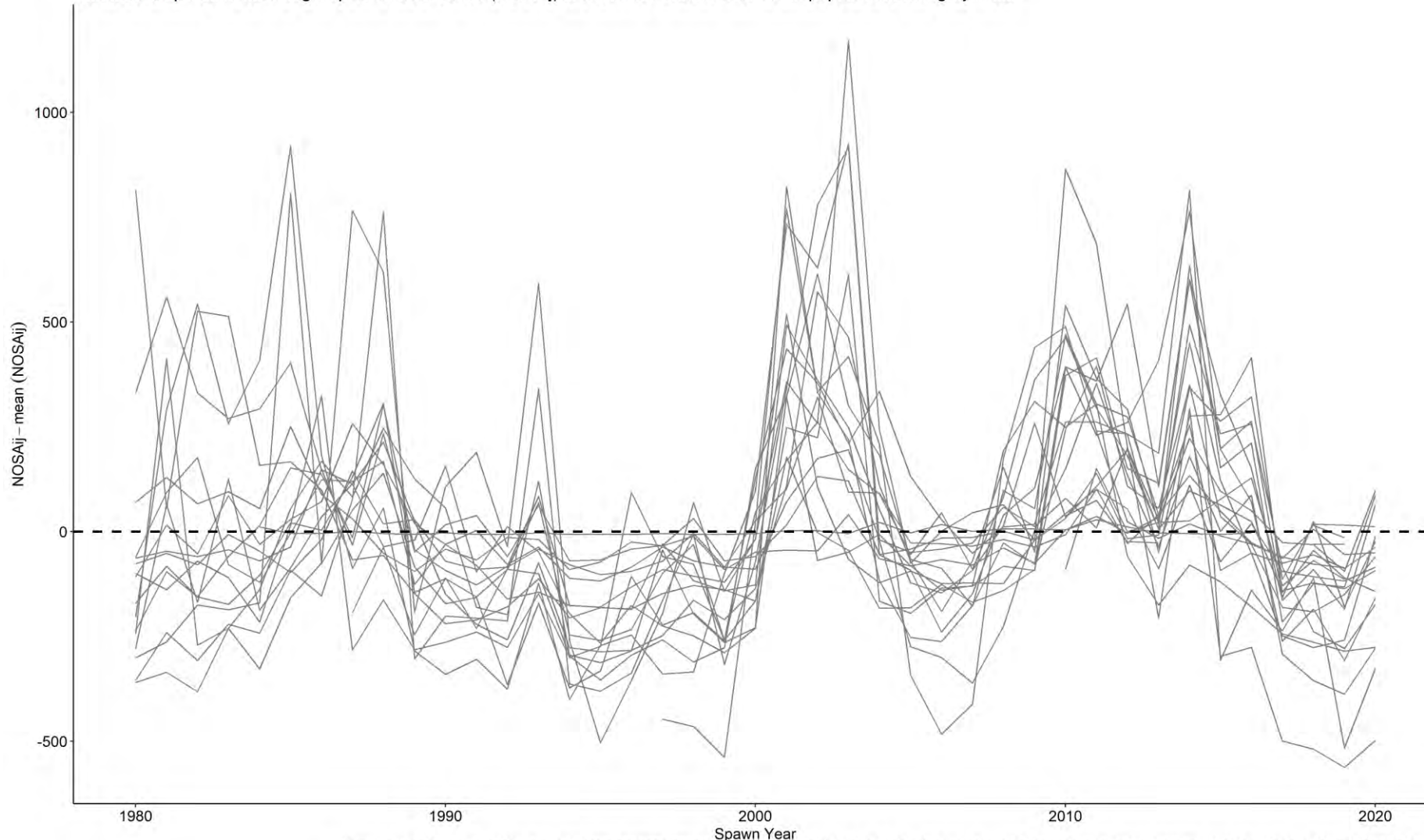


# Synchrony Across Populations

## Spring/summer Chinook

### Spring-summer Chinook Salmon

Centered empirical natural-origin spawner abundance (NOSAIj) is shown for Snake River Basin populations with grey lines.



Source: data through 2019 provided from Coordinated Assessments on 3/22/2021; 2020 data provided through personal communication with ODFW, IDFG and NPT





# Abundance Declining 19% Each Year

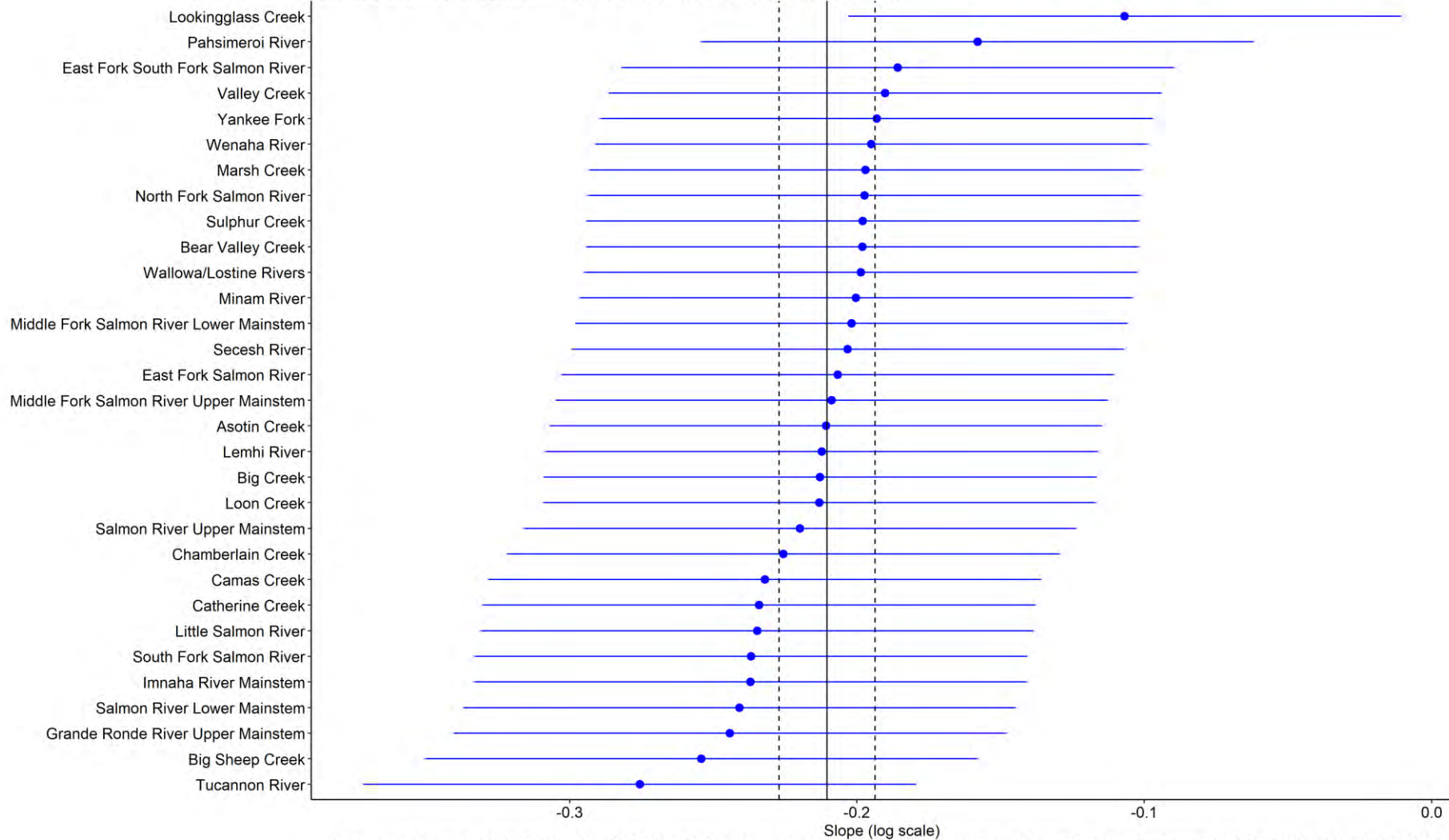
## Spring/summer Chinook

Snake Basin Chinook and Steelhead Quasi-Extinction Threshold Alarm and Call to Action  
 Presented to Northwest Power and Conservation Council May 5, 2021  
 Nez Perce Tribe Department of Fisheries Resources Management



### Spring-summer Chinook Salmon

Modeled natural-origin spawner abundance growth for last 10-years (2011-2020) across Snake Basin populations. Population abundance on average declined by approximately 19 % each year across the time period.



Source: data through 2019 provided from Coordinated Assessments on 3/22/2021; 2020 data provided through personal communication with ODFW, IDFG and NPT

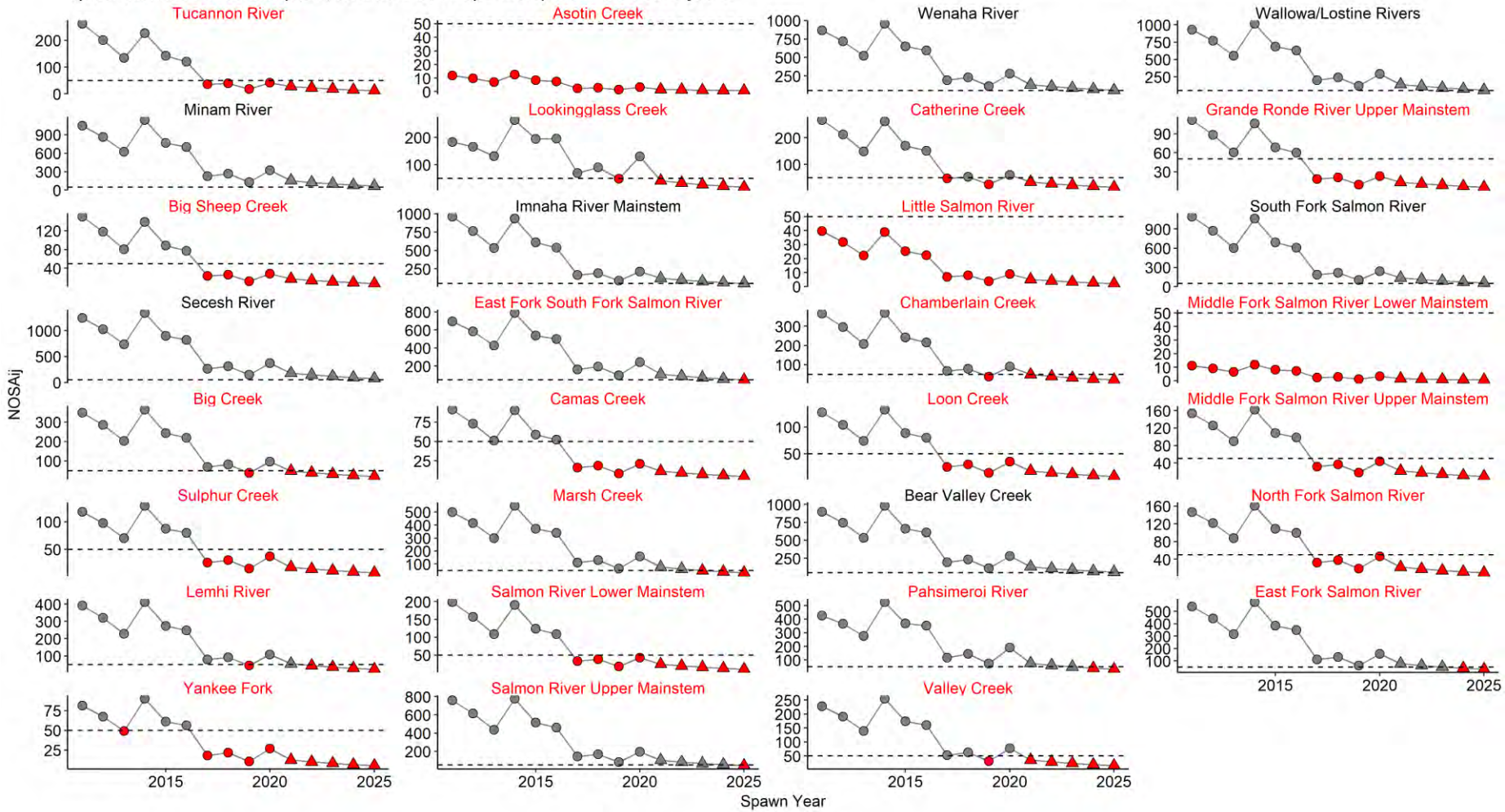


# 24 (77%) Spring/Summer Chinook Populations Predicted to be at or Below 50 spawners by 2025

Snake Basin Chinook and Steelhead Quasi-Extinction Threshold Alarm and Call to Action  
Presented to Northwest Power and Conservation Council May 5, 2021  
Nez Perce Tribe Department of Fisheries Resources Management

## Spring-summer Chinook Salmon

Future predictions of natural-origin spawner abundance (NOSaj) for Snake River Basin show 24 populations (77%) will start to drop below the the quasi-extinction threshold (QET; dashed line; 50 spawners) within the next 5 years.



Estimate Type ○ Modeled △ Prediction

Source: data through 2019 provided from Coordinated Assessments on 3/22/2021; 2020 data provided through personal communication with ODFW, IDFG and NPT





# Management Goals and Thresholds

## Snake Basin Steelhead

### 25 Extant (all ESA listed) Populations

#### Desired - Healthy and Harvestable - CBP

- Range from 2,500 to 7,500 per population.
- 137,480 escapement at Lower Granite, excluding blocked areas.
- Aggregated values for Snake Basin populations = 105,000 (100,000 at Lower Granite Dam).

#### Delisting – Minimum Abundance Threshold (MAT) – NOAA

- Range from 500 to 1,500 per populations.
- Aggregated values for Snake Basin populations = 21,500 (20,000 at Lower Granite Dam).

#### Critical - Quasi-Extinction Threshold (QET) - NOAA

- 50 or fewer spawners within a population for four consecutive years.
- Aggregated values for Snake Basin populations = 1,250 (1,200 at Lower Granite Dam).

#### Extirpation - Functionally Extinct or absolute Extinction

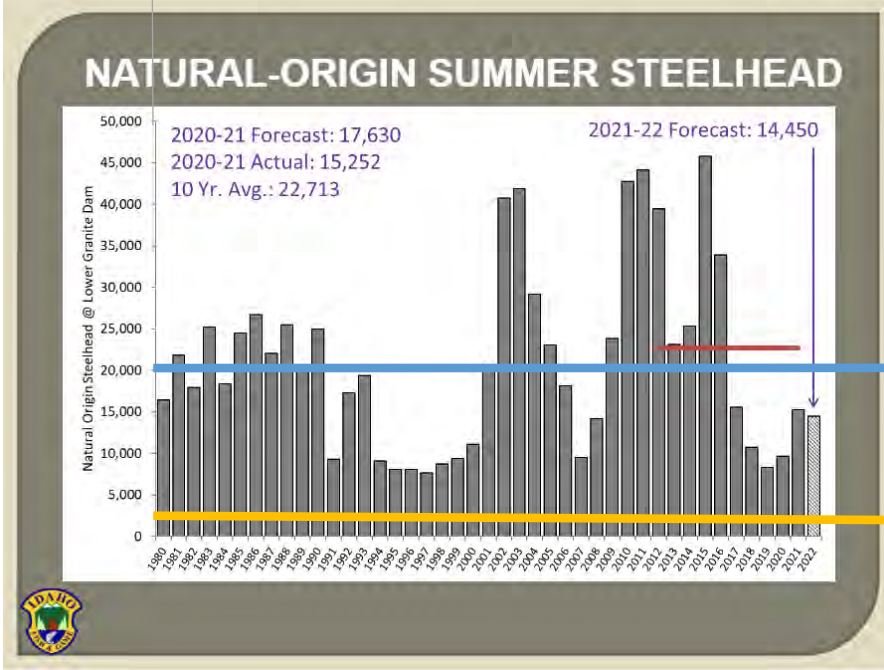
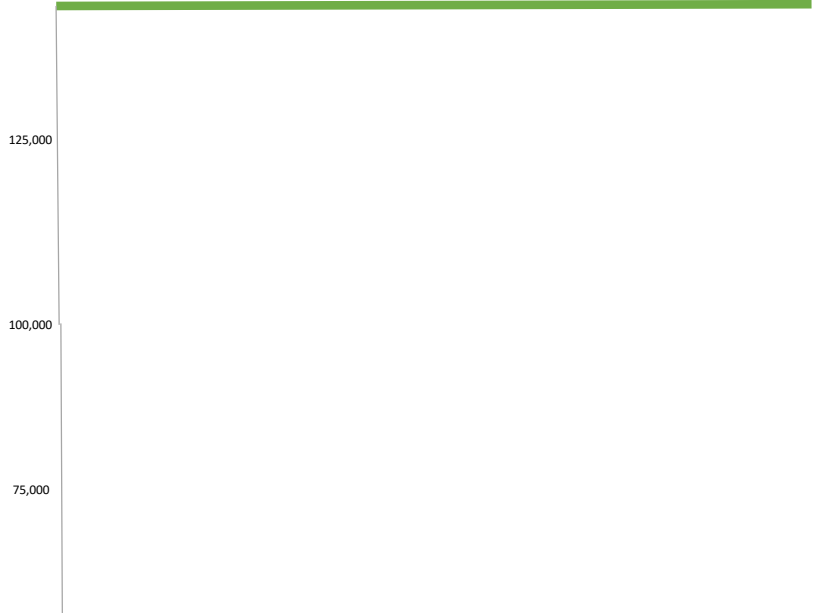
- One or fewer adults in each year of cohort/generation



# Snake River Steelhead Returns Relative to Aggregated Population Management Goals and Thresholds

Modified from IDFG March 2021 Presentation to NPCC

Desired = 137,480



Delisting = 20,000

Critical = 1,200



# Population Specific Abundance Data Sources and Attribution

- Summer Steelhead (STADEM and DABOM)
  - 2010-2019 - Coordinated Assessments
  - 2020 – Personal Communication with NPT
- Results limited to 16 of the 25 extant ESA listed steelhead populations.
- No data for two populations (Chamberlain Creek and Middle Fork Salmon Upper Mainstem).
- Six populations lack sufficient data (East Fork Salmon River, Grande Ronde Lower Mainstem, Lochsa River, North Fork Salmon River, Panther Creek, and Selway River).
- Assessment limited to anadromous form of *O. mykiss*.



Washington  
Department of  
**FISH** and  
**WILDLIFE**

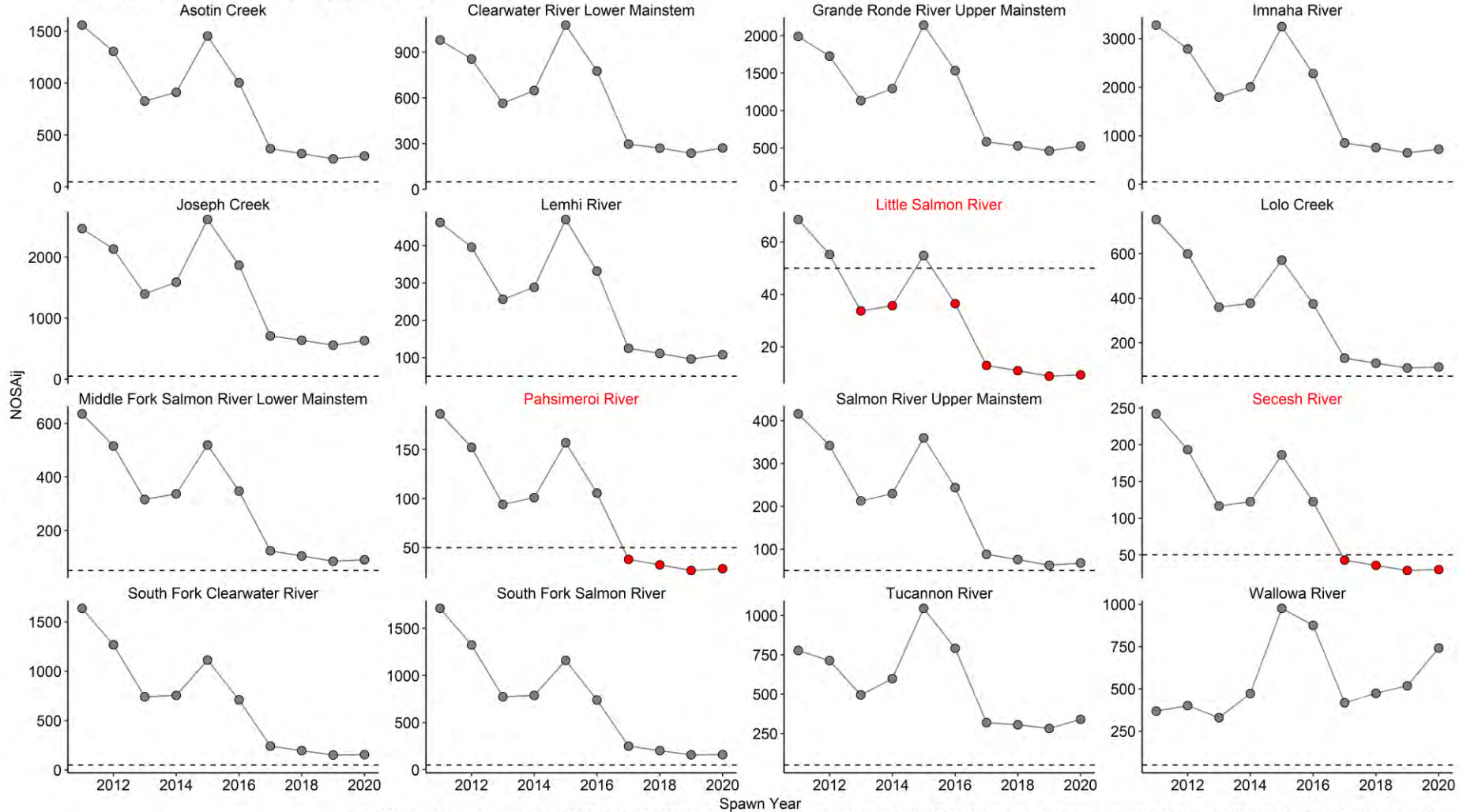




# 3 (19%) Summer Steelhead Populations Currently At or Below QET (50)

## Summer Steelhead

Modeled natural-origin spawner abundance (NOSAij) estimates for Snake River Basin populations relative to the quasi-extinction threshold (QET; dashed line, 4 years below 50 NOSAij) for the last 10-years (2011-2020). During the last four consecutive years 19% of the 16 populations had more than 4 years of abundances below the the QET.



Source: data through 2019 provided from Coordinated Assessments on 3/22/2021; 2020 data provided through personal communication with ODFW, IDFG and NPT





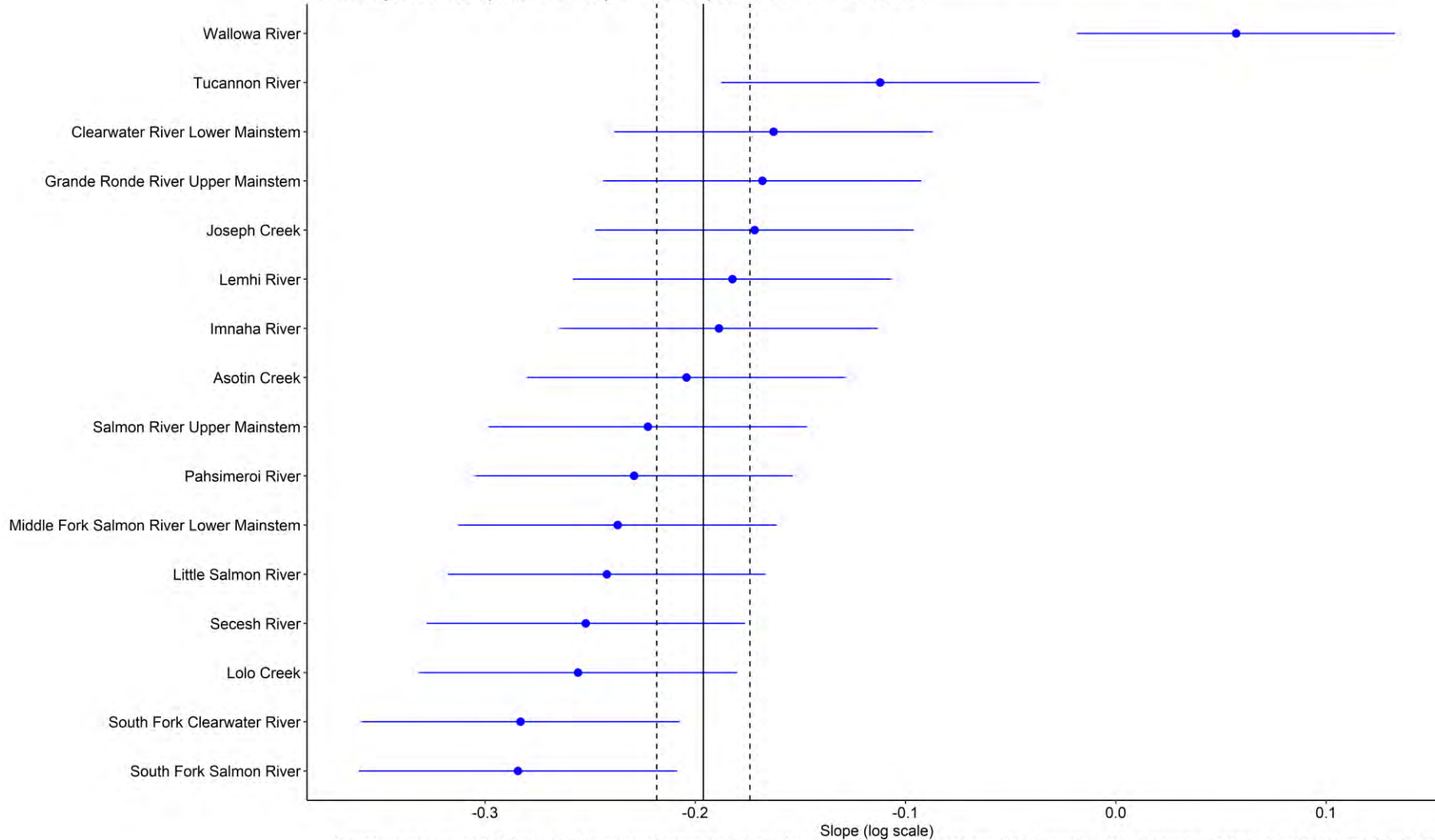
# Abundance Declining 18% Each Year

## B-run Populations Declining at Faster Rate

### Summer Steelhead

#### Summer Steelhead

Modeled natural-origin spawner abundance growth for last 10-years (2011-2020) across Snake Basin populations. Population abundance on average declined by approximately 18 % each year across the time period.



Source: data through 2019 provided from Coordinated Assessments on 3/22/2021; 2020 data provided through personal communication with ODFW, IDFG and NPT





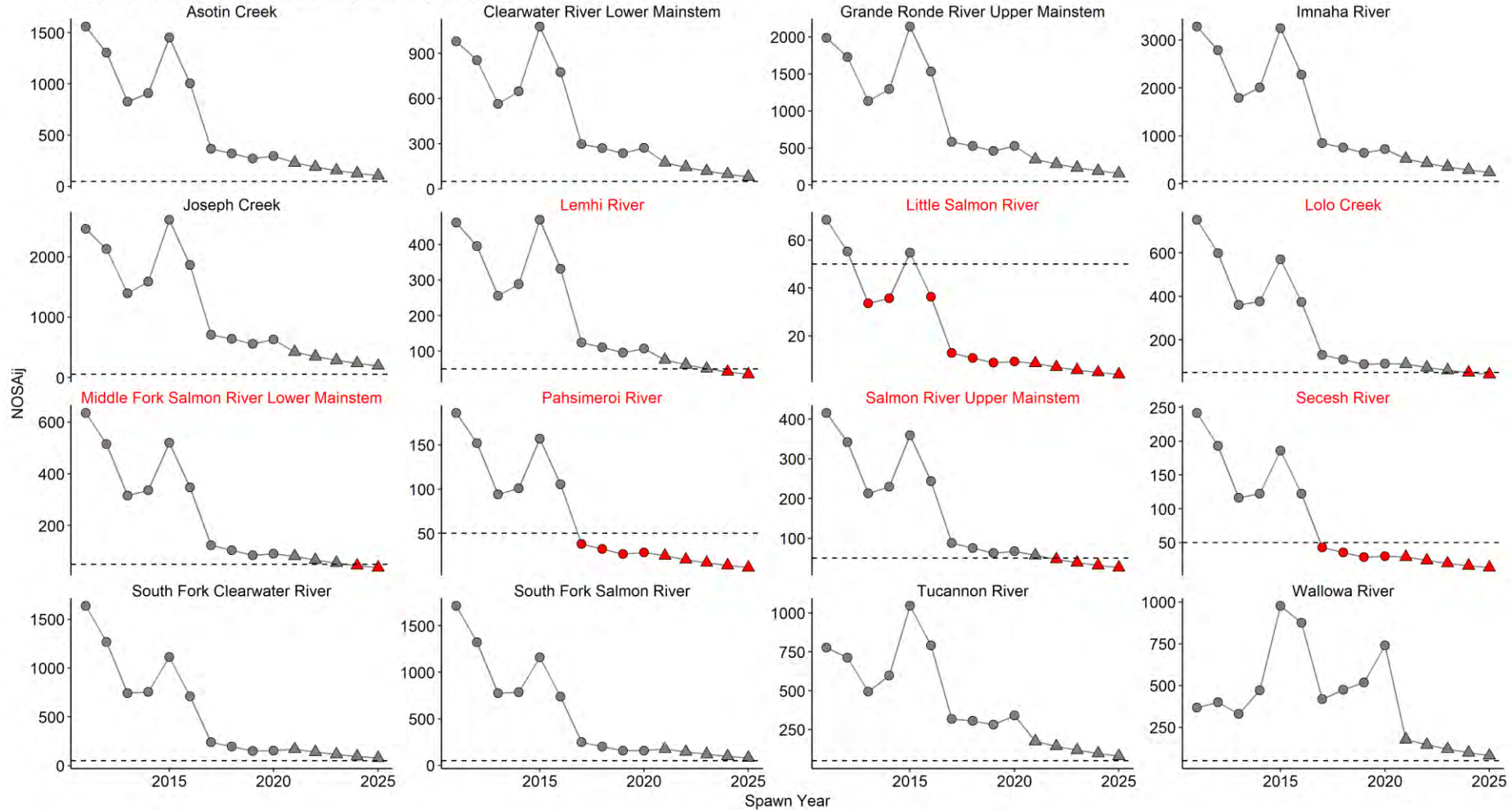


# 7 (44%) Summer Steelhead Populations Predicted to Be At or Below 50 spawners by 2025

Snake Basin Chinook and Steelhead Quasi-Extinction Threshold Alarm and Call to Action  
Presented to Northwest Power and Conservation Council May 5, 2021  
Nez Perce Tribe Department of Fisheries Resources Management

## Summer Steelhead

Future predictions of natural-origin spawner abundance (NOSAij) for Snake River Basin show 7 populations (44%) will start to drop below the quasi-extinction threshold (QET; dashed line; 50 spawners) within the next 5 years.



Estimate Type ○ Modeled △ Prediction

Source: data through 2019 provided from Coordinated Assessments on 3/22/2021; 2020 data provided through personal communication with ODFW, IDFG and NPT





# Challenging Environment Ahead

Urgency needed as at risk populations already well below forecasted abundance

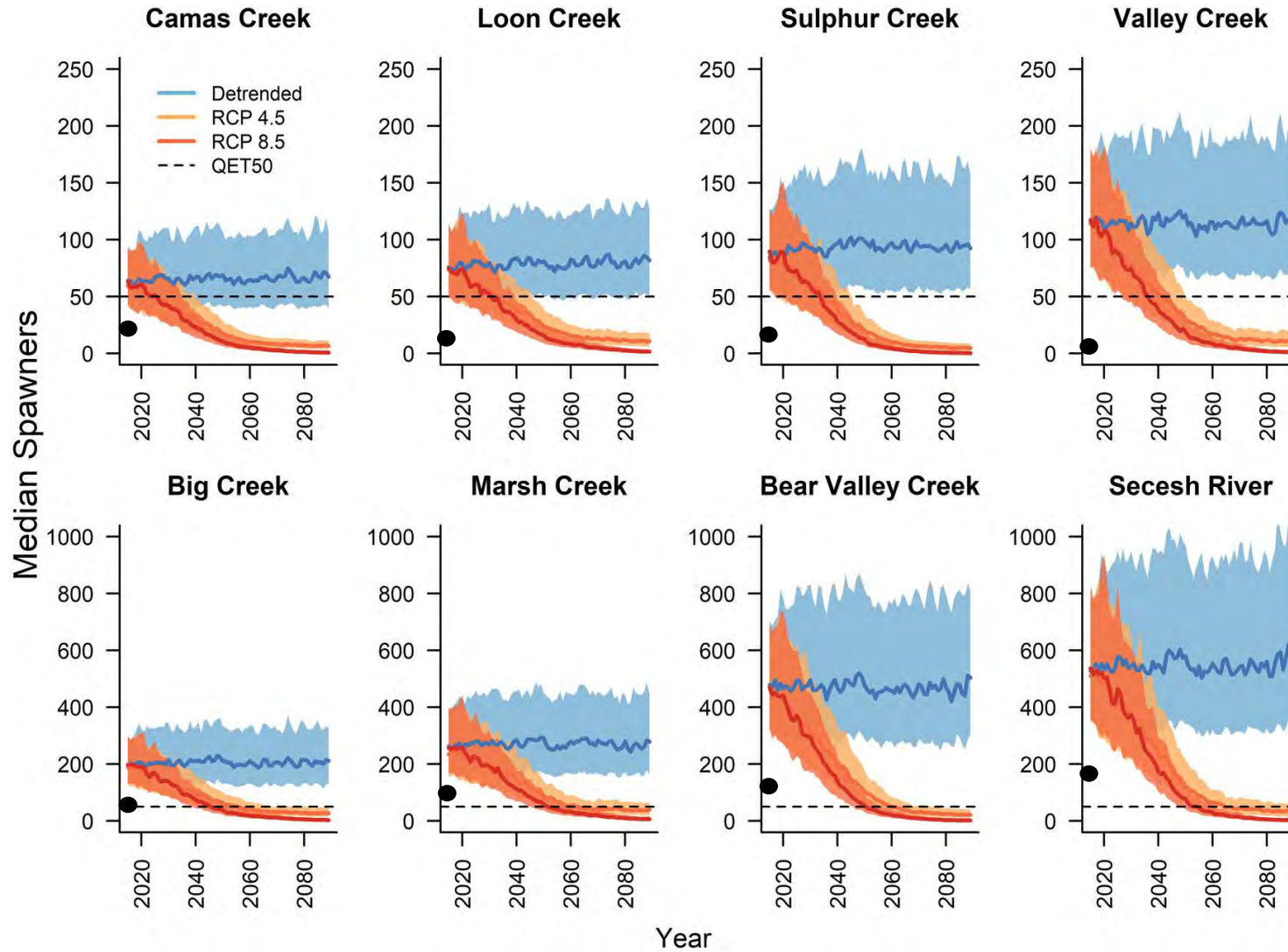
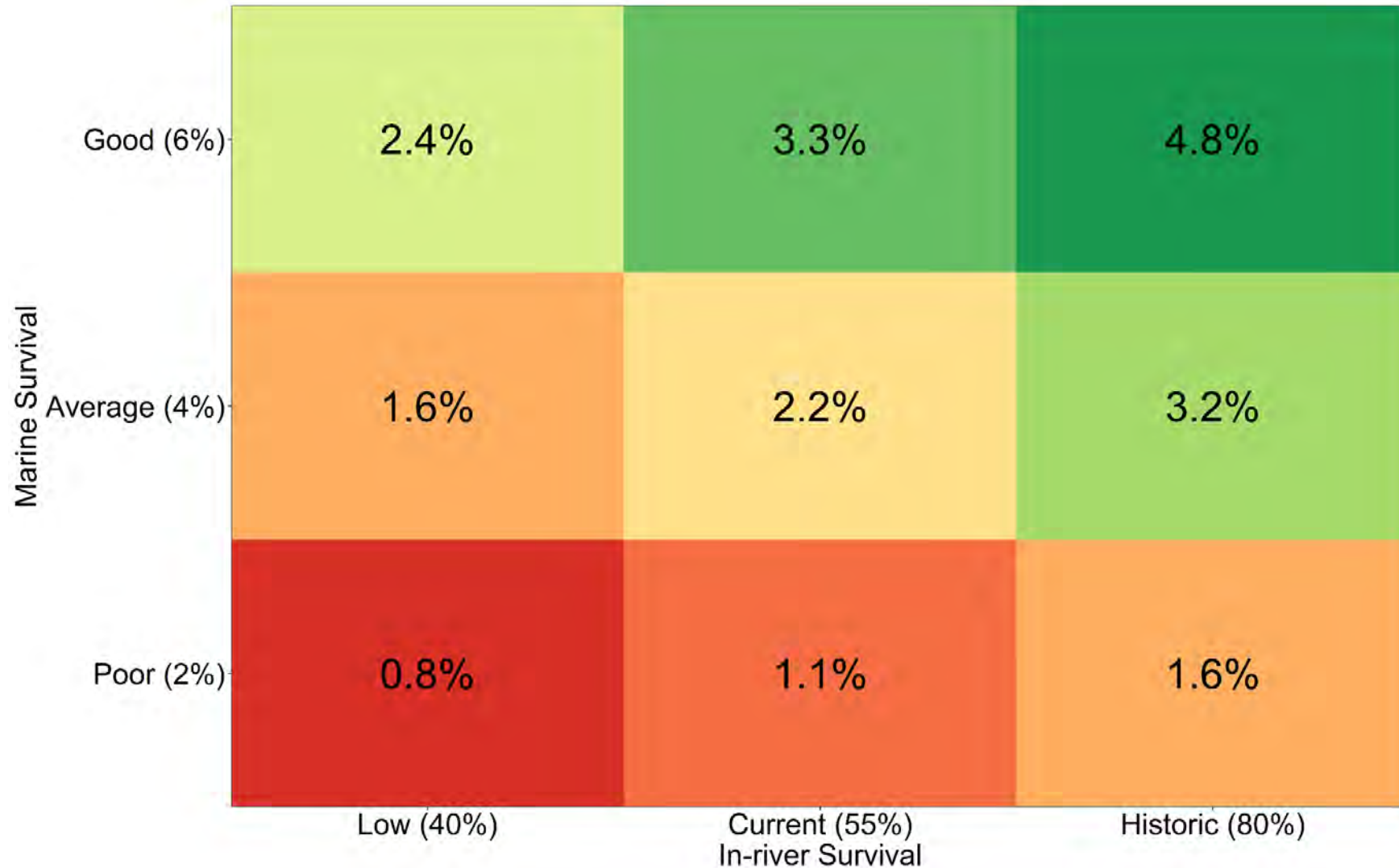


Fig. 4 - Crozier et al. 2021 (modified with actual 2019 abundance - indicated by black dots ●).





# Mainstem Survival Has Direct Effect on SARs and Number of Returning Adults (Generalized Example)





# At-Risk Populations Spring/summer Chinook

- 13 (42%) currently at or below QET (50) (highlighted yellow in table).
- 19 (61%) at or below 50 spawners in at least one year since 2017.
- 24 (77%) predicted to be at or below 50 by 2025 (red text in table).

MPG	Population	Endemic Hatchery	Cryo-preserved	Predator	Habitat	Hydro	Harvest	Listing Status
L Snake	Tucannon	X	X	M	X	X	M/T	T
	Asotin (ext)			M	X	X	M/T	T
Dr Y CI	Upper South Fork (ext)	X		M	X	X	M/T	
Wet Clearwater	Lolo (ext)	X		M	X	X	M/T	
	Lochsa (ext)	X		M	X	X	M/T	
	Meadow (ext)			M		X	M/T	
	Moose (ext)			M		X	M/T	
	Upper Selway (ext)	X		M		X	M/T	
Grande Ronde / Imnaha	Wenaha			M		X	M/T	T
	Minam		X	M		X	M/T	T
	Catherine	X	X	M	X	X	M/T	T
	Lookingglass (ext)	X		M	X	X	M/T	T
	Lostine/Wallowa	X	X	M	X	X	M/T	T
	U Grande Ronde	X	X	M	X	X	M/T	T
	Imnaha	X	X	M		X	M/T	T
South Fork Salmon	Big Sheep (ext)	X		M		X	M/T	T
	Little Salmon			M		X	M/T	T
	Secesh		X	M	X	X	M/T	T
	South Fork Salmon	X	X	M	X	X	M/T	T
Middle Fork Salmon	East Fork South Fork	X	X	M	X	X	M/T	T
	Chamberlain			M		X	M/T	T
	Big		X	M		X	M/T	T
	Lower Middle Fork			M		X	M/T	T
	Camas			M		X	M/T	T
	Loon			M		X	M/T	T
	Upper Middle Fork Salmon			M		X	M/T	T
	Sulphur			M		X	M/T	T
Upper Salmon	Bear Valley		X	M	X	X	M/T	T
	Marsh		X	M	X	X	M/T	T
	North Fork Salmon			M		X	M/T	T
	Lemhi			M	X	X	M/T	T
	Lower Mainstem Salmon			M		X	M/T	T
	Pahsimeroi	X	X	M	X	X	M/T	T
	East Fork Salmon			M		X	M/T	T
	Yankee Fork Salmon River	X		M	X	X	M/T	T
	Valley			M		X	M/T	T
Upper Salmon	Upper Mainstem Salmon	X	X	M		X	M/T	T
	Panther (ext)	X		M	X	X	M/T	T

Snake Basin Chinook and Steelhead Quasi-Extinction Threshold Alarm and Call to Action  
 Presented to Northwest Power and Conservation Council May 5, 2021  
 Nez Perce Tribe Department of Fisheries Resources Management





# Call to Action

- Multiple factors contributing to low abundance.
- Improving survival at multiple life stages needed.
- Maximizing freshwater survival during periods of poor ocean conditions paramount.
- Seek actions sufficient to address current crisis and help salmon thrive – Simpson solution.



# Bonus Slides

Snake Basin Chinook and Steelhead Quasi-Extinction Threshold Alarm and Call to Action  
Presented to Northwest Power and Conservation Council May 5, 2021  
Nez Perce Tribe Department of Fisheries Resources Management

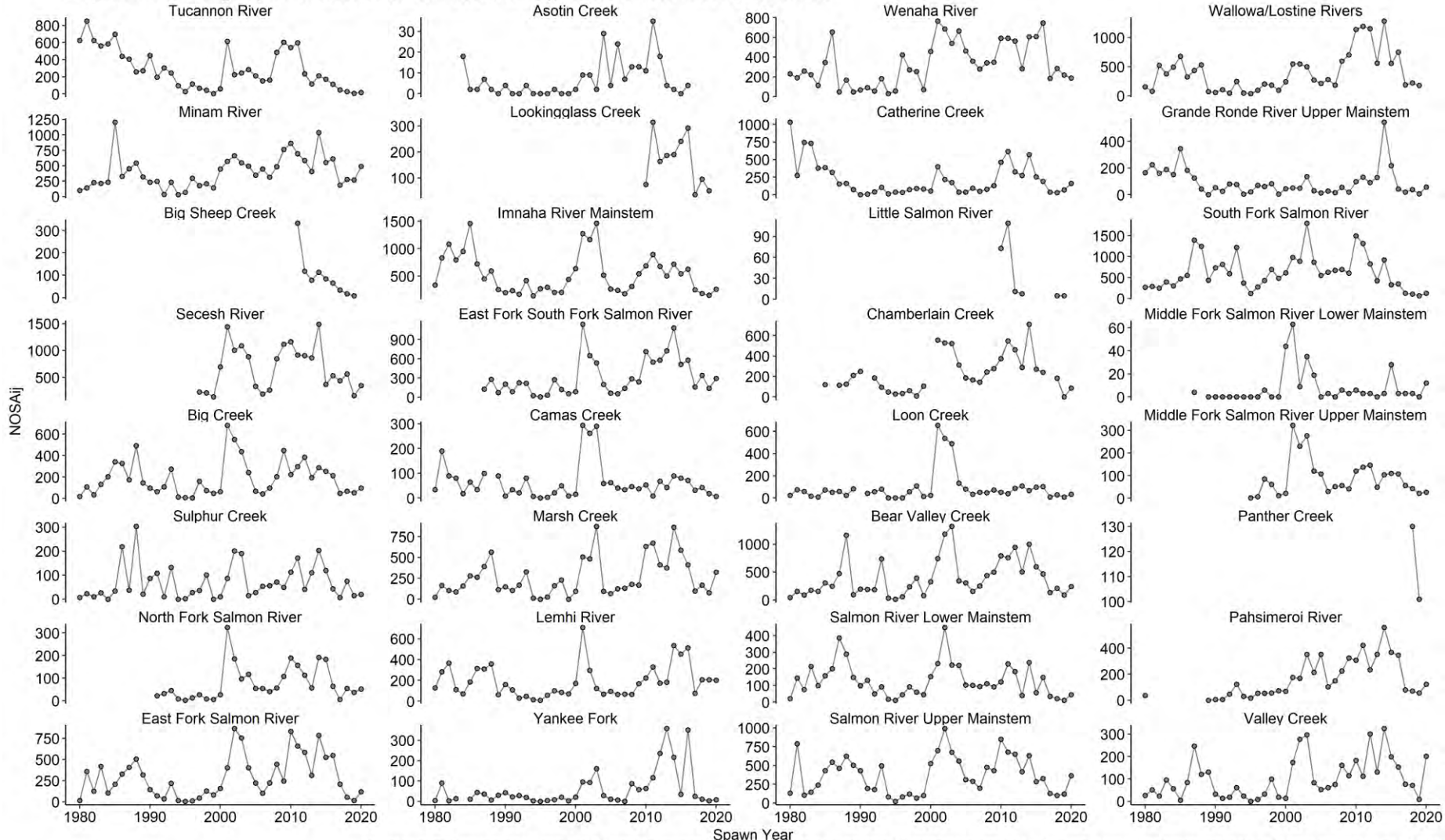




# Empirical Population Specific Abundance Spring/summer Chinook

## Spring-summer Chinook Salmon

Empirical natural-origin spawner abundance estimates (NOSaj) for Snake River Basin populations.



Source: data through 2019 provided from Coordinated Assessments on 3/22/2021; 2020 data provided through personal communication with ODFW, IDFG and NPT



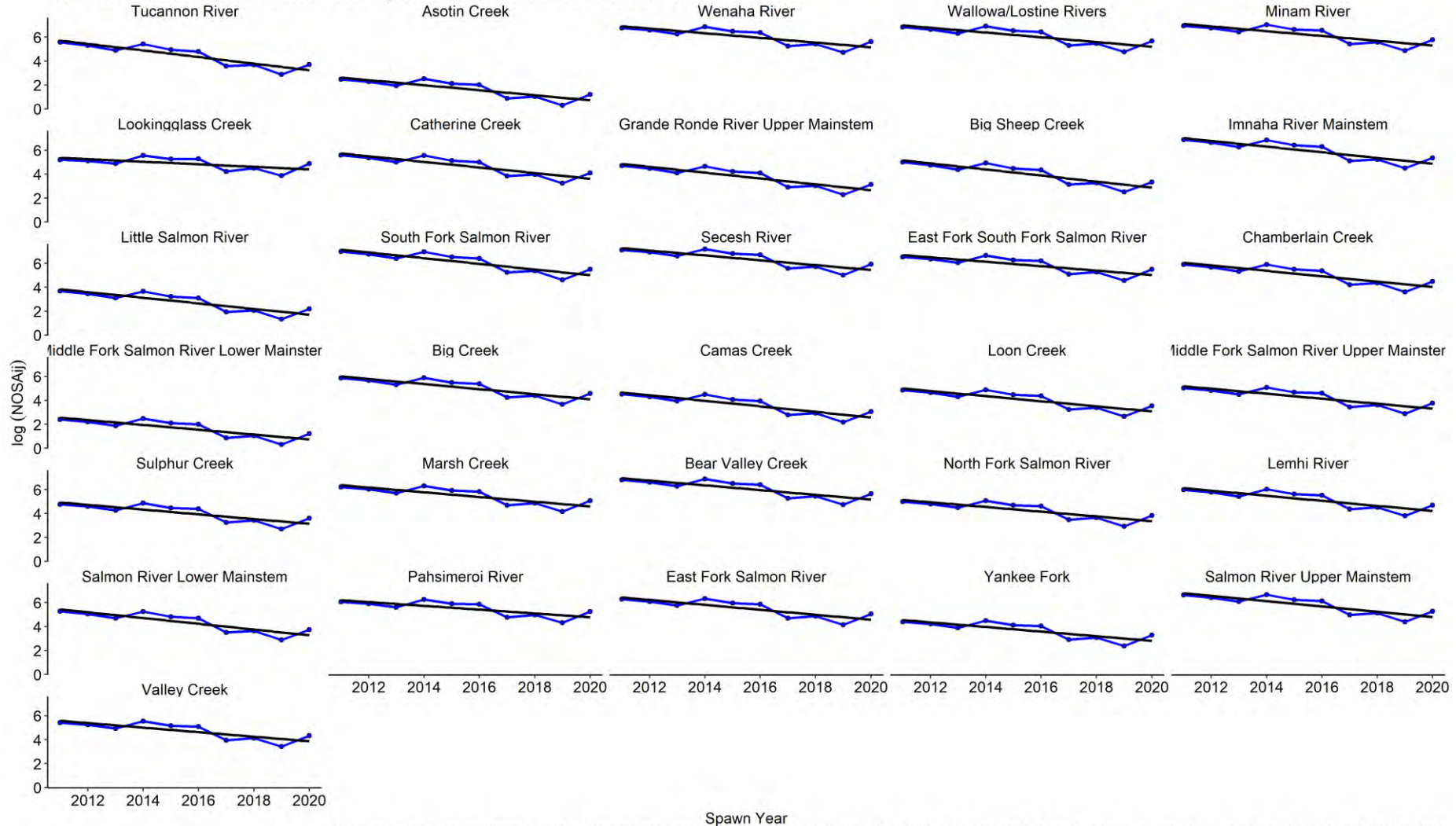


# Populations in Decline Over Last 10 Years

## Spring/summer Chinook

### Spring-summer Chinook Salmon

Modeled natural-origin spawner abundance (NOSA<sub>ij</sub>) estimates for Snake River Basin populations over the last 10-years (2011-2019; blue line), and a fitted linear regression model shown as the black line.



Source: data through 2019 provided from Coordinated Assessments on 3/22/2021; 2020 data provided through personal communication with ODFW, IDFG and NPT



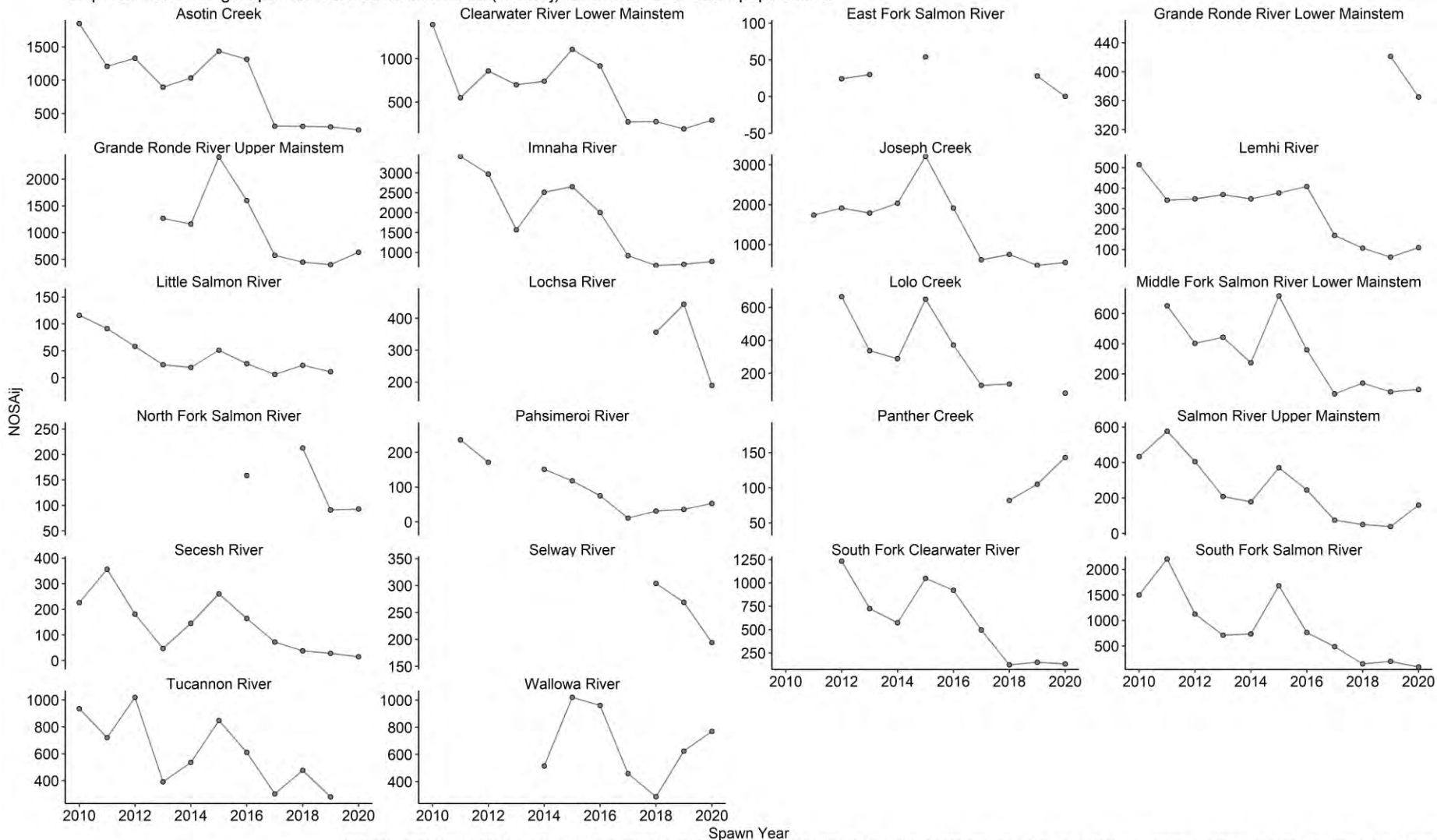


# Empirical Population Specific Abundance

## Summer Steelhead

### Summer Steelhead

Empirical natural-origin spawner abundance estimates (NOSaj) for Snake River Basin populations.



Source: data through 2019 provided from Coordinated Assessments on 3/22/2021; 2020 data provided through personal communication with ODFW, IDFG and NPT

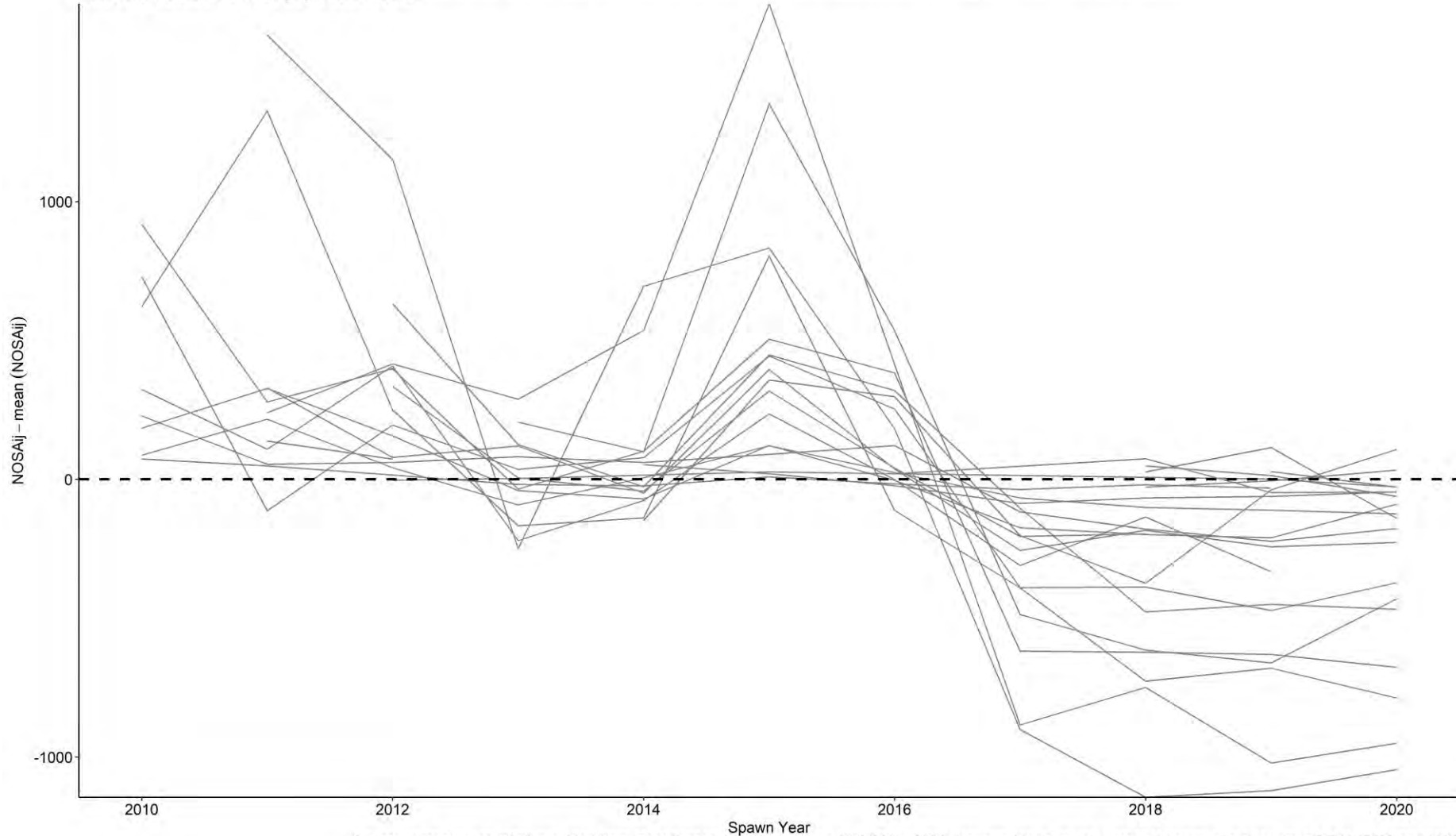


# Synchrony Across Populations

## Summer Steelhead

### Summer Steelhead

Centered empirical natural-origin spawner abundance (NOSA<sub>ij</sub>) is shown for Snake River Basin populations with grey lines. The solid blue line shows a common across population trend.



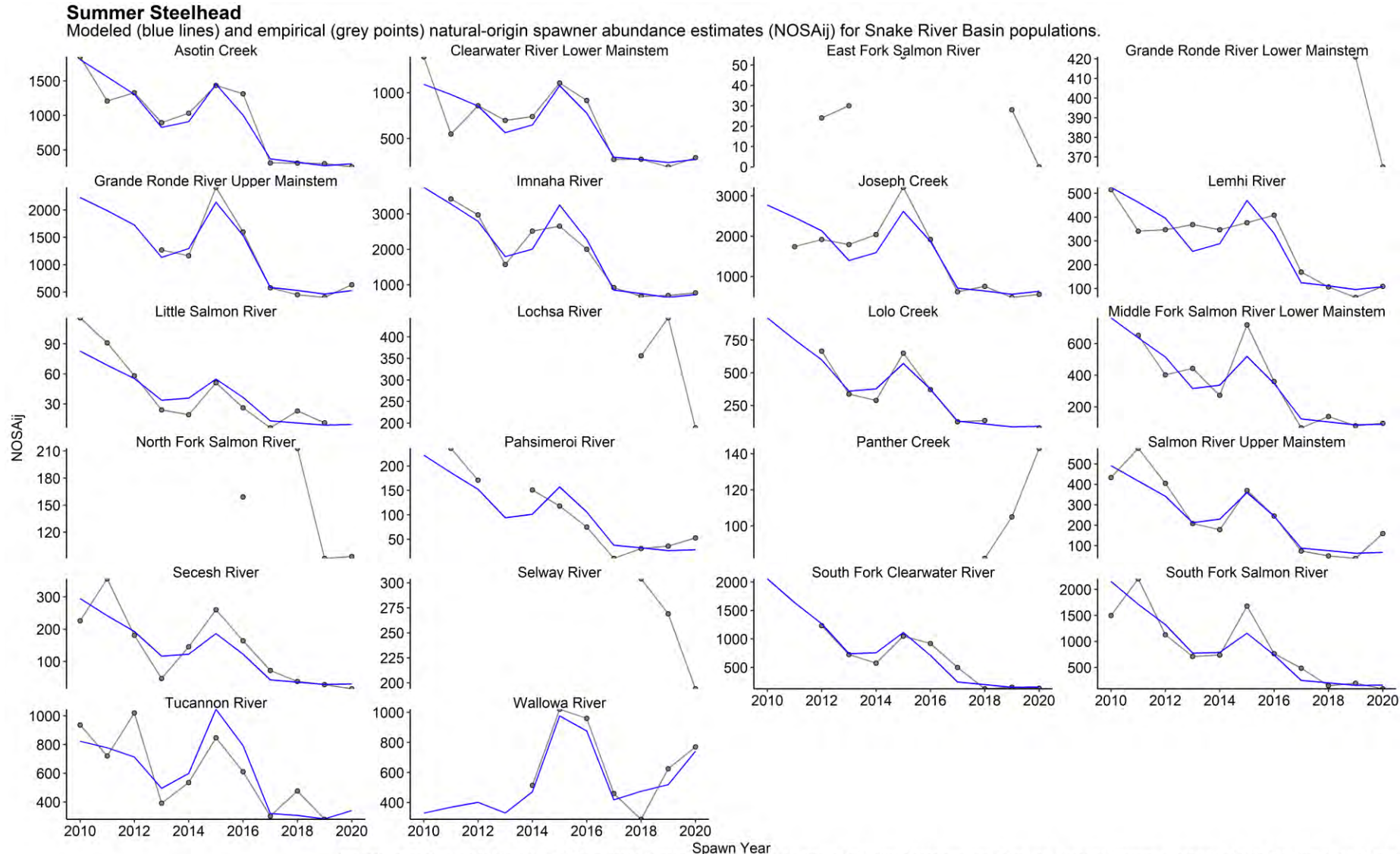
Source: data through 2019 provided from Coordinated Assessments on 3/22/2021; 2020 data provided through personal communication with ODFW, IDFG and NPT





# Abundance Fits Common Model Steelhead

Snake Basin Chinook and Steelhead Quasi-Extinction Threshold Alarm and Call to Action  
Presented to Northwest Power and Conservation Council May 5, 2021  
Nez Perce Tribe Department of Fisheries Resources Management



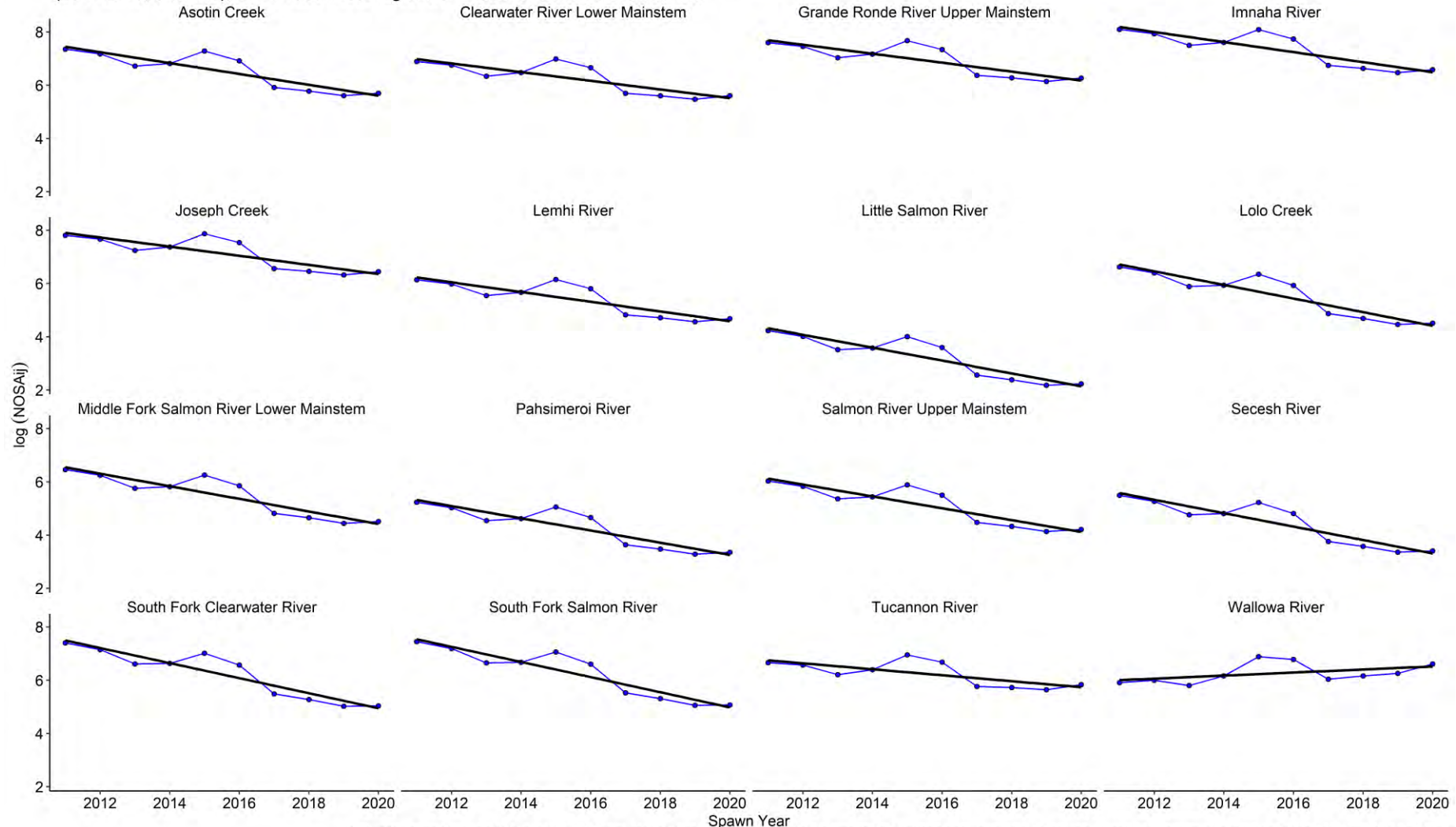
Source: data through 2019 provided from Coordinated Assessments on 3/22/2021; 2020 data provided through personal communication with ODFW, IDFG and NPT

# Most Populations in Decline Over Last 10 Years

## Summer Steelhead

### Summer Steelhead

Modeled natural-origin spawner abundance (NOSA<sub>ij</sub>) estimates for Snake River Basin populations over the last 10-years (2011-2019; blue line), and a fitted linear regression model shown as the black line.



Source: data through 2019 provided from Coordinated Assessments on 3/22/2021; 2020 data provided through personal communication with ODFW, IDFG and NPT

